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IS 10236-8 (1983): Procedure for basic climatic and durability test for optical instruments, Part 8: Thermal shock (rapid change of temperature) test [PGD 22: Educational Instruments and Equipment]



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“Knowledge is such a treasure which cannot be stolen”

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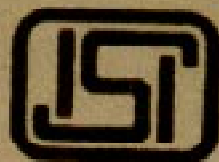
IS : 10236 (Part 8) - 1983

Indian Standard

PROCEDURE FOR
BASIC CLIMATIC AND DURABILITY
TESTS FOR OPTICAL INSTRUMENTS

PART 8 THERMAL SHOCK (RAPID CHANGE OF
TEMPERATURE) TEST

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

PROCEDURE FOR
BASIC CLIMATIC AND DURABILITY
TESTS FOR OPTICAL INSTRUMENTS

PART 8 THERMAL SHOCK (RAPID CHANGE OF
TEMPERATURE) TEST

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**Panel for Basic Climatic and Durability Tests for Optical
Instruments, EDC 36/P-1**

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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART 8 THERMAL SHOCK (RAPID CHANGE OF TEMPERATURE) TEST

0. FOREWORD

0.1 This Indian Standard (Part 8) was adopted by the Indian Standards Institution on 28 September 1983, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Fast development in the field of instruments has brought a significant change in their basic content and design. It has been felt over the years that IS : 2352-1963* does not cater for the present day needs of the instruments and is also not in line with the recent trends in climatic and environmental testing procedures to be adopted for improving their quality and reliability. It has, therefore, become necessary to have uniform and more rational testing procedures as far as possible. This series of standards on climatic and durability tests (IS : 10236) has been prepared with this objective.

0.2.1 It is proposed to withdraw the existing Indian Standard (IS : 2352-1963*) as soon as the tests mentioned therein are covered in this new series of IS : 10236.

1. SCOPE

1.1 This standard (Part 8) covers the procedure for conducting thermal shock (rapid change of temperature) test for optical instruments.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions given in IS : 10236 (Part 1)† shall apply.

*Procedure for basic climatic and durability tests for optical instruments.

†Procedure for basic climatic and durability tests for optical instruments: Part 1 General (under preparation).

3. OBJECT

3.1 The object of this test is to determine suitability of optical instruments to withstand satisfactorily rapid change of temperature such as could be encountered in transfer from one region to another, air transportation, storage or use in outdoor conditions.

4. INITIAL MEASUREMENT

4.1 The instrument shall be visually examined and optically, electrically and mechanically checked as required by the relevant instrument specification.

5. TEST CHAMBER

5.1 Two chambers (one cold and the other dry heat chamber) shall be used for this test. The chambers shall be located such as to allow a rapid transfer of the instrument from one chamber to the other.

NOTE — Two separate chambers for this test would not be necessary where one integral chamber having provision of cold and dry heat conditions is available.

5.2 The dry heat chamber and cold chamber shall be conforming to the requirements as specified in IS : 10236 (Part 2)-1982* and IS : 10236 (Part 3)-1982†, respectively.

6. TEST SEVERITIES

6.1 Alternate exposure for the specified duration to the following temperature severities:

I	$70 \pm 3^{\circ}\text{C}$ and $-40 \pm 3^{\circ}\text{C}$
II	$70 \pm 3^{\circ}\text{C}$ and $-30 \pm 3^{\circ}\text{C}$
III	$55 \pm 3^{\circ}\text{C}$ and $-20 \pm 3^{\circ}\text{C}$
IV	$55 \pm 3^{\circ}\text{C}$ and $-10 \pm 3^{\circ}\text{C}$

6.1.1 Duration and total number of cycles shall be as stated in the relevant instrument specification.

7. TEST PROCEDURE

7.1 The instrument shall be subjected to the test in the unpacked condition or as specified in the relevant instrument specification.

*Procedure for basic climatic and durability tests for optical instruments: Part 2 Dry heat test.

†Procedure for basic climatic and durability tests for optical instruments: Part 3 Cold test.

7.2 The instrument at laboratory atmospheric conditions shall be introduced into the dry heat chamber maintained at a temperature appropriate to the stipulated degree of severity.

7.3 The instrument shall remain at this temperature for a period of three hours or as specified in the relevant instrument specification.

7.4 The instrument shall then be transferred to the cold chamber maintained at a temperature appropriate to the stipulated degree of severity. The period of transfer from dry heat chamber to cold chamber shall be as short as possible and in no case it shall exceed three minutes.

NOTE — During transfer of the instrument from dry heat chamber to the cold chamber precaution shall be taken to minimise condensation on the instrument.

7.5 The instrument shall remain at this low temperature for a period of three hours or as specified in the relevant instrument specification.

7.6 For one set of severity the duration of exposure to high temperature and low temperature shall be same.

7.7 The conditioning specified in 7.2 to 7.5 shall constitute one cycle. For the next cycle the instrument shall be taken out from the cold chamber, allowed to attain room temperature and followed through the procedure specified in 7.2 to 7.5.

7.8 The instrument shall be subjected to this test for three cycles or as specified in relevant instrument specification.

7.9 Recovery — At the end of the last cycle the instrument shall be removed from the cold chamber and kept under standard atmospheric conditions for recovery for not less than one hour nor more than two hours.

8. FINAL MEASUREMENT

8.1 The instrument after recovery shall be visually examined and tested for its performance in accordance with the relevant instrument specification and in case of tropicalised instruments also for leaks.

9. DETAILS TO BE GIVEN IN RELEVANT INSTRUMENT SPECIFICATION

9.1 The relevant instrument specification shall state the following for carrying out this test:

- (a) Initial observations/measurements;

- (b) Test severity with number of cycles;
- (c) Whether the instrument is to be tested in the unpacked condition or otherwise;
- (d) Duration of exposure to cold/dry heat condition;
- (e) Final observations/measurements; and
- (f) Any deviation from the normal procedure.